NAME: DATE:

# Unit-2 Mastery Assessment (version 645)

**Question 1 (10 points)**

Let $f$ represent a function. If $f[29] = 2$, then there exists a knowable solution to the equation below.

$$y = 36 \cdot f[4x + 17] - 33$$

Find the solution.

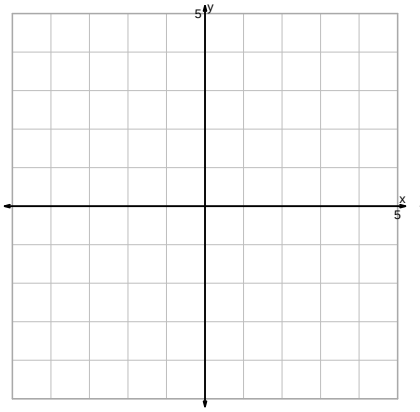
$x =$

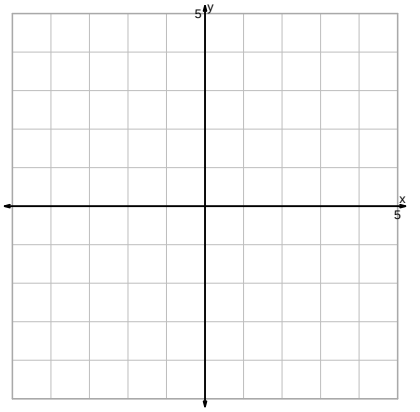
$y =$

**Question 2 (20 points)**

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

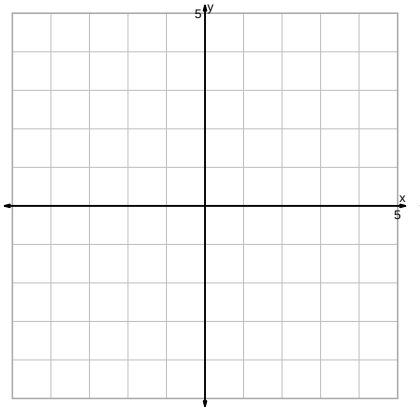
$y = 2^{-x}$

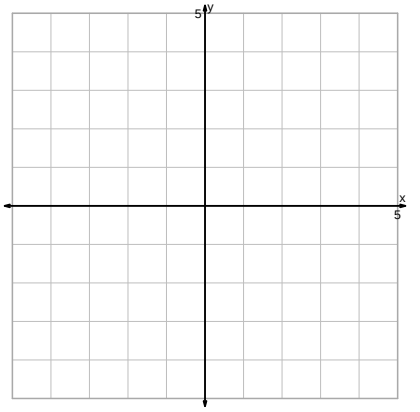



$y = \sqrt{x} - 2$

$y = (2x)^3$

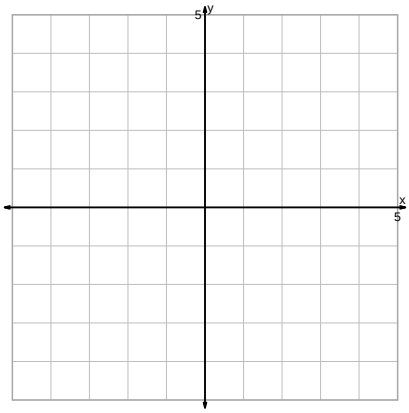


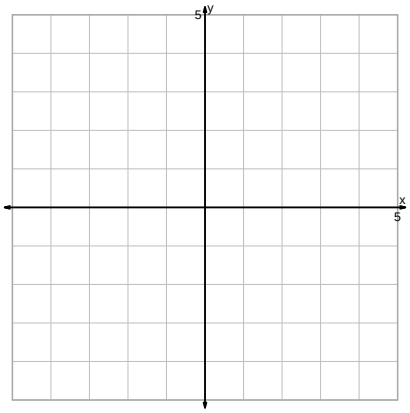




$y = \frac{x^3}{2}$

**Question 2 continued...**

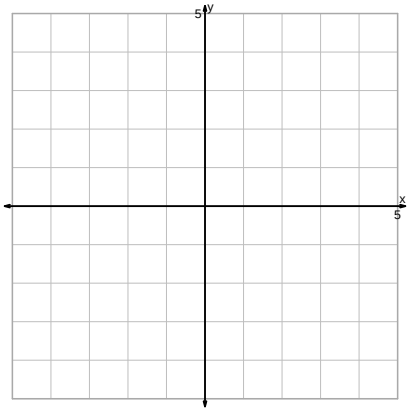
$y = x^2 + 2$

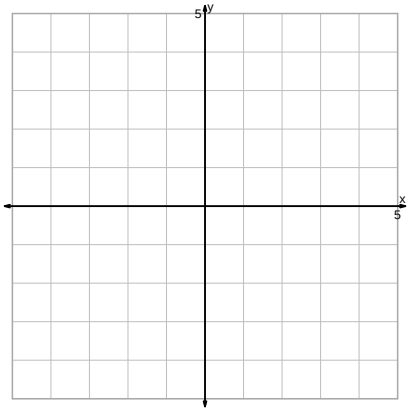



$y = (x - 2)^2$

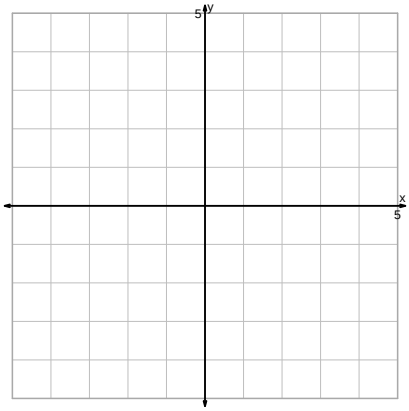
$y = \sqrt[3]{x + 2}$

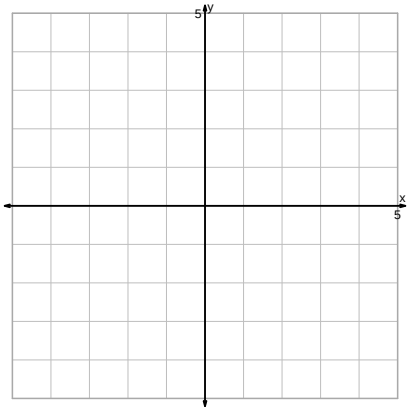



$y = -\sqrt{x}$

$y = 2 \cdot \sqrt[3]{x}$

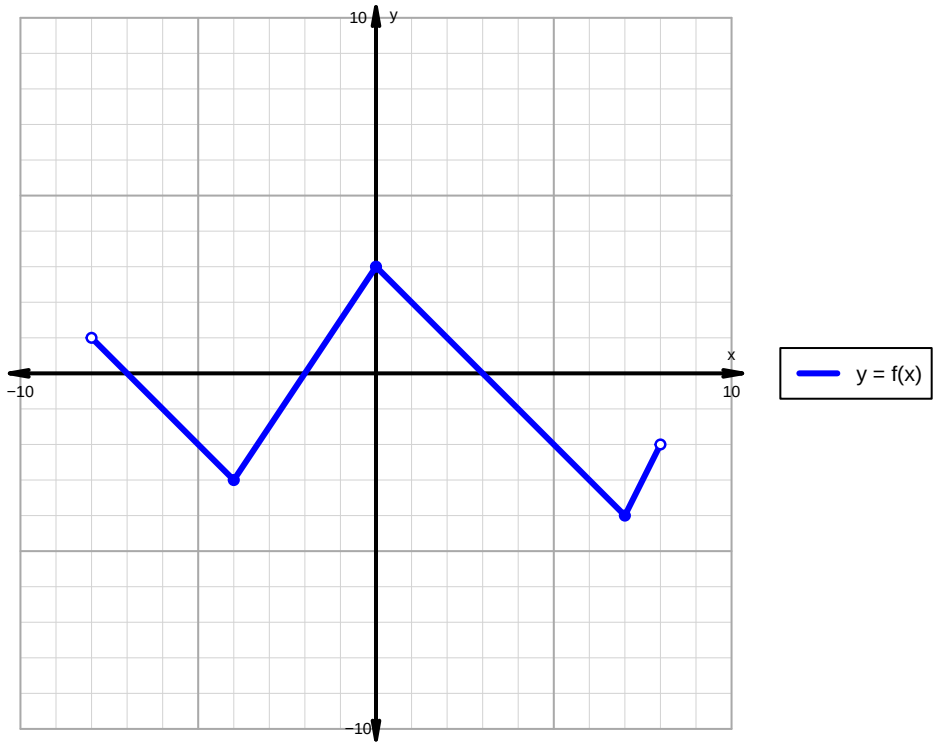



$y = 2^{\frac{x}{2}}$

**Question 3 (20 points)**

A function is graphed below.



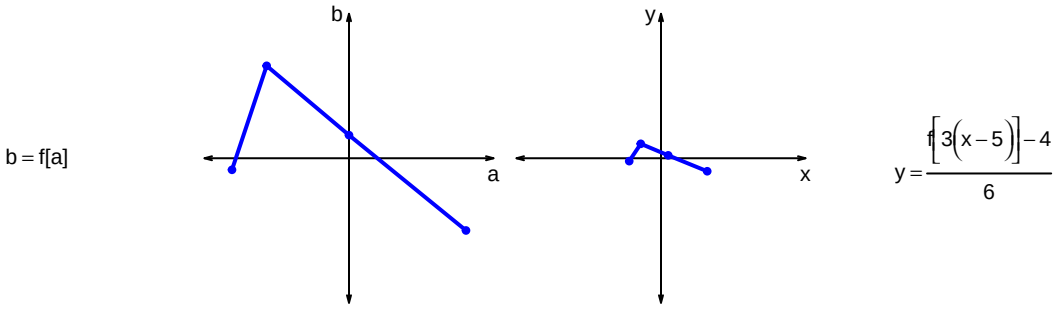

Indicate the following intervals using interval notation.

| Feature | Where |
|---|---|
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |
| Domain | |
| Range | |

**Question 4 (20 points)**

Let $f$ represent a function. The curves $b = f[a]$ and $y = \frac{f[3(x-5)]-4}{6}$ are represented below in a table and on graphs.

| a | b | x | y |
|---|---|---|---|
| -81 | -8 | -22 | -2 |
| -57 | 64 | -14 | 10 |
| 0 | 16 | 5 | 2 |
| 81 | -50 | 32 | -9 |




a. Write formulas for calculating $x$ from $a$ and calculating $y$ from $b$. (Or, write the coordinate transformation formula.)

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = \frac{f[3(x-5)]-4}{6}$?

**Question 5 (10 points)**

A parent square-root function is transformed in the following ways:

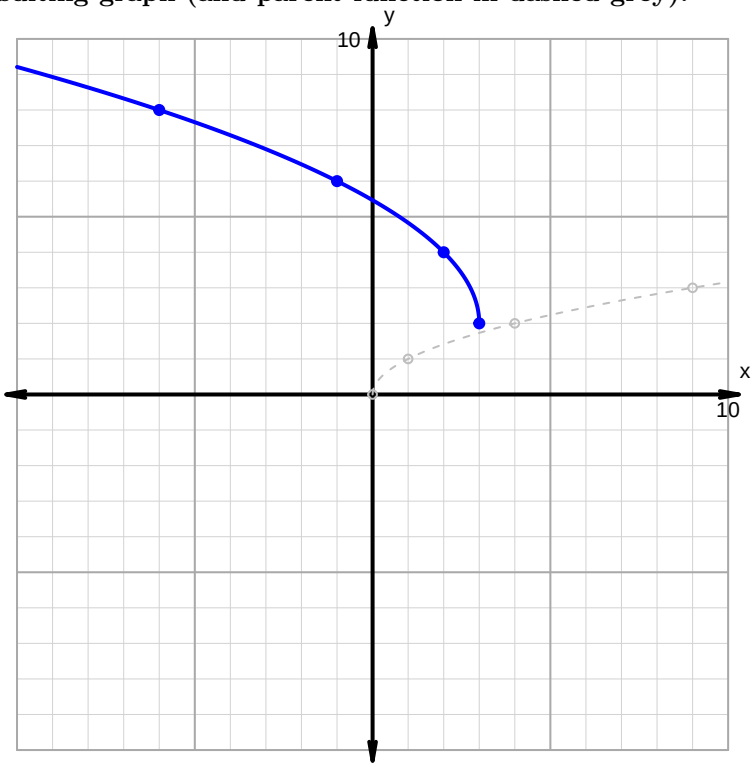
**Horizontal transformations**

1. Translate left by distance 3.
2. Horizontal reflection over $y$ axis.

**Vertical transformations**

1. Translate up by distance 1.
2. Vertical stretch by factor 2.

**Resulting graph (and parent function in dashed grey):**

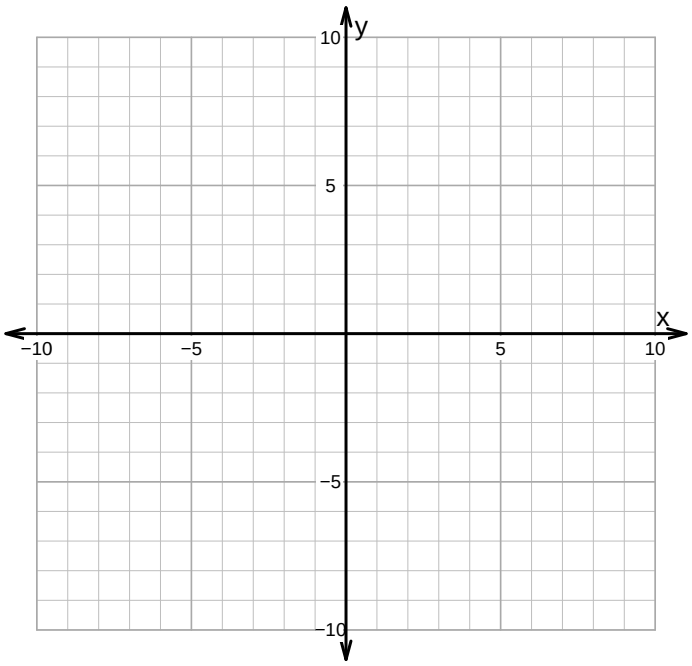



- What is the equation for the curve shown above?

**Question 6 (20 points)**

Make an accurate graph, and describe locations of features.

$$y \;=\; -3 \cdot |x + 2| + 9$$




| Feature | Where |
|---|---|
| Domain | |
| Range | |
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |